

XV.—On some Fishes from the Lakes of the Cameroon Mountain. By Dr. EINAR LÖNNBERG, C.M.Z.S. &c.

A FEW weeks ago I received from my friend Gunnar Linnell, residing at Cape Debundscha, a small collection of fish which is of considerable interest, having been obtained from the small isolated lakes of volcanic origin on the Cameroon Mountain, viz. Lake Barombi-ba-kotta and the Elephant Lake.

The natural conditions of the latter lake have been mentioned in my previous paper on fishes from the Cameroon (Ann. & Mag. Nat. Hist. ser. 7, vol. xii., July 1903) and need not be repeated. Concerning the Lake Barombi-ba-kotta, the Swedish civil engineer P. Dusén gives the following information * :—In the middle of the lake is a small islet of basalt. On the western side there is a steep slope about 10 metres in height, but the surroundings are not very high and crater-walls seem to be absent. Mr. Dusén is therefore uncertain whether to regard this lake as a very old crater or a "Maar" formation. The lake receives only a small tributary, the rivulet Manatunge, at the mouth of which basalt-rocks were seen; but there is no watercourse leading from the lake or draining it, so that it is thus fully isolated. The lake appears to be situated about 20 kilometres from Mungo River as the crow flies, and about twice as far from the nearest sea-shore. Mr. Dusén puts its altitude above the sea-level at 90 m. In these circumstances it is therefore the more interesting to find that it has a fish-fauna consisting of at least five species of Cichlidæ, which have been sent to me by Mr. Linnell, namely :—

Hemichromis fasciatus, Peters.

A small specimen.

Pelmatochromis longirostris, Boulenger.

A specimen in good condition.

Tilapia macrocephala (Bleeker).

A fine large specimen, measuring 189 mm., with quite normal dentition.

Tilapia kottæ, sp. n.

Scales cycloid, without marginal denticulations. About 10 gill-rakers on lower part of anterior arch. An outer series of teeth of moderate size, two or three inner series of very

* Geol. Fören. Förh. no. 155, Bd. xvi. (Stockholm, 1894).

minute teeth. Depth of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in total length without caudal. Length of head $2\frac{2}{3}$ (in younger) to $2\frac{5}{6}$ times (in older specimens) in total length. Snout and forehead with straight upper profile, forming a distinct although blunt angle with the outline of the back. Diameter of eye contained $1\frac{1}{3}$ (in younger) to $1\frac{1}{2}$ times (in older specimens) in length of snout, $3\frac{1}{3}$ (in younger) to 4 times (in older) in length of head, $1\frac{1}{4}$ to $1\frac{1}{3}$ in interorbital width. Maxillary extending almost to the vertical through the anterior border of the eye. Three series of scales on the cheeks; opercle with large scales. Dorsal XV (XVI in one specimen) (11-)12; last spine longest, $\frac{4}{9}$ to $\frac{1}{2}$ length of head; middle soft rays produced $1\frac{1}{2}$ times as long as longest dorsal spine. Pectoral not extending to origin of anal, pointed, but in all specimens a little shorter than head. Ventral produced, usually reaching vent or a little beyond. Anal III 8, third spine shorter than last dorsal; soft rays produced $1\frac{1}{2}$ times as long as third anal spine. Caudal truncate or a little emarginate. Scales cycloid, 26-27 $\frac{3-2\frac{1}{2}}{10-11}$; lat. line $\frac{19-20}{12-13}$. Very faint traces of four or five dusky hairs may be seen in some specimens, in others not. A black opercular spot always present, and a blackish spot at the base of the anterior soft rays of the dorsal. Anal often more or less dusky to blackish; in the latter case, the chin, lower jaw, ventrals, and more or less of the opercle and belly as well as lower half of the caudal are blackish to black. In some specimens roundish light spots surrounded by dusky are seen on the posterior part of the soft dorsal and upper half of the caudal. The black-bellied specimens are smaller, but have a larger anal papilla, and an examination of the interior proves that they are males. The larger specimens with light-coloured belly are females. As the genital organs do not contain ripe products, it is evident that the sexual difference in colour is constant, and not confined to the breeding-season. The males measure 10 to 12 cm. in length, the females $12\frac{1}{2}$ to 14 cm.

I am much indebted to Mr. Boulenger, who has kindly sent me a specimen of *Tilapia Zillii* (Gervais) from Lake Menzaleh, Egypt, which he regards as most nearly related to the *Tilapia* from Lake Barombi-ba-kotta. There are, however, several characteristics that show these two fishes to be quite distinct from each other. The shape is different: in *T. Zillii* the profile forms an even bow without the pronounced nuchal angle of *T. kottæ*; in the former species the soft rays of the dorsal and anal fins are much more produced, so that they are about twice as long as the

longest anal spine. The number and arrangement of scales also differ; for instance, in *T. Zillii* there are $4-3\frac{1}{2}$ scales between the lat. 1. and anterior dorsal spines, and $2\frac{1}{2}$ between the posterior end of lat. 1. and the dorsal, whereas in *T. kottæ* the same numbers are 3 and $1\frac{1}{2}$. The proportions are also dissimilar: in two specimens of exactly the same length the head of *T. kottæ* is 36 % and that of *T. Zillii* only 31 % of the total length without caudal. The colour is also different, as *T. Zillii* has 6 to 8 dark bars and sometimes a longitudinal stripe. All these particulars, together with the geographical separation, induce me to establish a separate species, named after Lake Barombi-ba-kotta. According to Mr. Boulenger, *T. Zillii* is distributed from the Algerian Sahara to Lake Rudolph and the Lake of Galilee.

From the *Tilapia lata* group, *T. kottæ* is distinguished by its shorter pectorals &c.

Mr. Linnell has obtained quite a number of specimens of *T. kottæ*, so that the above description is based on several examples.

Tilapia dubia, sp. n.?

It is with much hesitation that I propose this new species, as it is based on only one specimen; but, on the other hand, its markings are so distinct, and it differs so decidedly from the species of *Tilapia* to which it might otherwise be related, that it seems incorrect not to describe it separately.

An outer series of rather large and only slightly notched teeth, about 14 on each side of the upper jaw; on the inner side of this outer row two or three series of minute teeth. Depth of body 2 times in total length without caudal, length of head 3 times. Snout with straight upper profile, as long as diameter of eye, which is contained 3 times in length of head and $1\frac{1}{6}$ times in interorbital width. Maxillary extending to between nostril and eye. Three series of scales on the cheek; large scales on the opercle. Gill-rakers short, 13-14 on lower part of anterior arch. Pectoral pointed, much longer than head, and extending a good deal beyond the origin of anal. Ventral not produced reaching vent but not beyond. Dorsal XVI 13, spines subequal from the fifth, about $\frac{1}{2}$ length of head. Anal III 10, third spine stouter than dorsal spines, but of nearly the same length. (Caudal mutilated.) Caudal peduncle nearly $1\frac{1}{2}$ as deep as long. Scales cycloid, probably about 27-28 $\frac{3}{12}$, lat. lin. $\frac{21}{2}$. An opercular black spot, another at the base of the anterior soft rays of the dorsal. Eight dark bars, the first just in front of the opercular spot, the second

from the foremost dorsal spines, the fifth from the dark spot of soft dorsal, the sixth at the end of the dorsal, and the eighth at the base of the caudal. Anal and ventrals dusky to blackish. Total length with the caudal probably about 82–85 mm.

This form is evidently closely allied to *T. Mariæ*, Boulenger, with which it agrees in relative dimensions of head and body, number of rays of vertical fins, and exterior markings. The differences are found in the dentition (as Mr. Boulenger says * respecting *T. Mariæ*, "teeth small, in three series"), and in the shortness of the pectoral in the last-mentioned species, in which it is only as long as head and does not extend to origin of anal. On the other hand, the ventrals of *T. Mariæ* are longer and reach origin of anal. That species has also four series of scales on the cheek. It should also be mentioned that Boulenger's specimens were about the same size as mine, so that the differences are not due to age.

T. Büttikoferi (Hubrecht) seems also to resemble this form in having eight dark bars and similar relative proportions. The teeth of the outer row in that species are also similarly enlarged; but *T. Büttikoferi* differs in having "5 or 6 series of scales on the cheek," smaller number of spines but larger number of soft rays in the dorsal, shorter pectoral (subequal to or shorter than head, not extending to origin of anal), and longer ventral as in *T. Mariæ*. To unite these appears therefore impossible or only apt to cause confusion. When these fishes become more perfectly known, it may be possible to place some series of forms together as subspecies under one and the same species; but this seems rather early yet, and therefore it is best to collect as much knowledge as possible by carefully describing the different varieties.

From the Elephant Lake only one species has been added to the collection †, but it is of interest as being new to science. It is a *Barbus* of the *B. Byuni* group, and I propose to call it

Barbus Linnellii, sp. n.

Depth of body $3\frac{1}{2}$ to nearly 4 ($3\frac{9}{10}$) times in total length

* In his very valuable paper "A Revision of the African and Syrian Fishes of the Family Cichlidæ.—Part II.," Proc. Zool. Soc. London, 1899, p. 98.

† Mr. Linnell informs me that Mr. Rätke, of the German station, Johann Albrechtshöhe, helped him to procure this fish from the Elephant Lake.

without caudal; length of head $3\frac{1}{4}$ to $3\frac{1}{2}$ times in total length. Snout rounded, $2\frac{1}{2}$ times (or slightly more) in length of head. Diameter of eye (of these large specimens) 6 to $6\frac{1}{3}$ times in length of head. Interorbital width about equal to length of snout, thus about $2\frac{1}{2}$ to $2\frac{2}{3}$ times in length of head. Mouth inferior; lips well developed, lower continuous. Barbels two on each side, the posterior a little longer than the anterior, exceeding the latter by a fourth or a fifth of its length; the anterior is equal to diameter of eye or a little ($\frac{1}{3}$ to $\frac{1}{10}$) longer, the posterior is $1\frac{1}{3}$ times diameter of eye; the distance between the barbels is quite intermediate between the length of anterior and posterior barbels. Dorsal III 9; last simple ray rather strong, bony, not serrated, slightly curved, a little more than half as long as head (55%); free edge of the fin emarginate, its distance from the occiput less than its distance from the caudal. Anal III 5, longest anal ray decidedly longer than longest dorsal ray, and measuring $\frac{2}{3}$ (68%) length of head. Pectoral about $\frac{3}{4}$ length of head, not reaching ventral, latter below anterior part of dorsal. Caudal peduncle $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as deep. Scales 20–27 $\frac{4-4\frac{1}{2}}{3\frac{1}{2}}$, 2 (or $2\frac{1}{2}$) between lateral line and root of ventral, 12 round caudal peduncle. Two specimens, respectively 360 and 435 mm. in length.

This *Barbus* is no doubt nearly related to *B. Batesii*, Boulenger, but differs from that species in several respects. Since Mr. Boulenger described * *B. Batesii* on a single specimen from Kribi River, Southern Cameroons, he has received several specimens from 185 to 340 mm. long, and he has in the most friendly way favoured me with a fresh description (for which I owe him my best thanks) of this species, based on the increased material. A comparison with this description reveals that *Barbus Linnellii* differs from *B. Batesii* in several particulars. The former has a comparatively larger head and longer snout. Its interorbital width is larger, but the barbels, and the distance between them, when compared with the diameter of the eye are smaller. The dorsal is lower, but the anal is rather higher when compared with the length of the head. The scales are fewer in number and larger, as may readily be seen. The two forms must therefore be kept distinct, even if *Barbus Linnellii* of the Elephant Lake be regarded as derived from *B. Batesii* through isolation.

The Museum, Gothenburg,
Jan. 6th, 1904.

* Proc. Zool. Soc. 1903, vol. i. p. 25.